ABSTRACT

Disclosed is a transition-metal chalcogenide crystal having a topological configuration/ structure. A micro-droplet of a chalcogen element, such as S, Se or Te, is condensed and circulated in suspended form in an atmosphere containing a Group IVb, Vb or VI transition metal element, such as Nb, Ta, Zr, Ti, Hf or W, together with the chalcogen element. Then, micro-whiskers of a transition metal chalcogenide formed in the atmosphere are attached onto a surface of the chalcogen-element micro-droplet by the action of a surface tension of the micro-droplet, and grown as a loop-shaped crystal wound around the surface of the micro-droplet to obtain a loop-shaped crystal having a twist of 0, π or 2π. The crystal has a ribbon-like open or closed loop configuration. The transition-metal chalcogenide crystal with the topological loop-shaped microstructure can exhibit original properties peculiar to each transition-metal chalcogenide, and has applicability, for example, to a quantum device, such as SQUID.